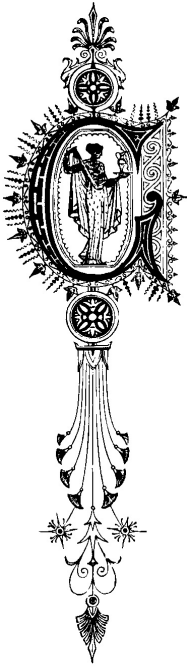


Early Globes/Globe Gores: An Introduction



Terrestrial globes are basically spherical maps of the earth and their surfaces, full of detail and color, that like maps, always draw our interest and hold our attention. In the past they were much more than this. The engraved brass meridian rings and printed horizon rings encircling old globes were not merely decorative features. They were there for a purpose. A terrestrial globe represented the known earth. As Sylvia Sumira states in her book *Globes, 400 years of Exploration, Navigation and Power* (2014), globes were more complex objects than they initially appear, and they could be used to perform many tasks. They played a significant role in the distribution of new knowledge and they encapsulated the need to find our place in the cosmos.

The printed globe, as we know it today, emerged in the early 16th century. Around this time several factors came together to make it possible and timely for globes to be produced in greater numbers on a commercial basis. However, we know that globes - terrestrial and celestial- were made before 1500, but very few have survived. Those that we know about were one-off items, made for a specific purpose or person, and they were few and far between.

It is not easy to fix, with anything like a satisfactory measure of certainty, the beginning of globe construction; obviously it was not until a spherical theory the heavens and the earth had been accepted, and for this we are led back to the time of Aristotle (fourth century B.C.) and beyond, indeed to the Pythagoreans if not yet farther. We find allusions to celestial globes in the days of Eudoxus and to terrestrial globes in the days of Crates of Mallos (150 BC) and Hipparchus. We find that the Greek geographer Strabo (18 A.D.) gives us quite a definite word concerning their value and their construction, and that Ptolemy (200 A.D.) is so definite in his references to them as to lead to a belief that globes were by no means uncommon instruments in his day, and that they were regarded of much value in the study of geography and astronomy, particularly of the latter science. There is, however, but one example known, which has come down to us from that ancient day, this a celestial globe, which described as the *Farnese* globe. It is of marble, and is thought by some to date from the time of Eudoxus (second century A.D.), that is three hundred years before the Christian era.

Therefore the idea of making spherical models of the earth and heavens originated with the ancient Greeks. It seems the concept of the earth as a sphere was first postulated around the time of Pythagoras in the sixth century BC. This idea gradually came to be accepted by other thinkers of the ancient world. Plato (c. 429- 347 BC) alludes to the earth being like a leather ball in his *Phaedo* of 380 BC, and Aristotle (384-322 BC) too was convinced that the earth was spherical. The first record of an actual globe being made is found in verse written by the poet Aratus of Soli (c. 315- 240/239 BC), who describes a celestial sphere with the stars drawn on it made by Eudoxus of Cnidus (c. 408-355 BC). Plato, Aristotle and Eudoxus all theorized about an earth-centered universe. Crates of Mallos (#113) is known for the construction of a large terrestrial globe that showed the earth divided into four distinct habitable regions. There are other references to globes being used in teaching, but these very early globes have not survived and it is not known how they were made or what they looked like. After this

time, knowledge of the ancients declined in the Christian world and there are very few references to the making of globes for a thousand years.



*The Farnese globe,
2nd century A.D.*

To the Muslims of the Middle East belongs chief credit for keeping alive an interest in astronomical studies during the so-called Christian Middle Ages, and we find them interested in globe construction, that is, in celestial globe construction; so far as we have knowledge, it seems doubtful that they undertook the construction of terrestrial globes.

Among the Christian peoples of Europe in this same period there was not wanting an interest in both geography and astronomy. According to Edward Luther Stevenson in his famous two-volume book, *Terrestrial and Celestial Globes, their history and construction including a consideration of their value as aids in the study of geography and astronomy* (1921), we are now learning that those centuries were not entirely barren of a certain interest in sciences other than theological. In Justinian's day, or near it, one Leontius Mechanicus busied himself in Constantinople with globe construction, and we have left to us his brief descriptive reference to his work. With stress laid, during the many centuries succeeding, upon matters pertaining to the religious life, there naturally was less

concern than there had been in the humanistic days of classical antiquity as to whether the earth is spherical in form or flat like a circular disc, nor was it thought to matter overmuch as to the form of the heavens. Yet

there was no century, not even in those "dark" ages, that geography and astronomy were not studied and taught, and globes celestial as well as armillary spheres, if not terrestrial globes were constructed. The Venerable Bede, Notker, Pope Sylvester I, the Emperor Frederick II, and Alonso of Castile, not to name many others of perhaps lesser significance, displayed an interest in globes and globe making.

There are records of terrestrial globes made in the 15th century but the earliest extant example, from 1492 was by Martin Behaim (1459-1507) of Nuremberg (#258), a cultural center for scholars, artists and instrument-makers, and a crossroads for all types of trade and commerce.

Globes made before 1500 were all manuscript globes - that is, they were unique items, drawn, painted or engraved by hand. Their production was slow and costly to make, and could not be easily replicated. The *Behaim* globe was an expensive one-off, but unlike previous globes, it had a public impact. The costs of producing the globe were met by the Nuremberg city council and it was displayed in the Town Hall for many years after its completion. It seems likely that the public nature of this ambitious project to represent the whole world in its proper shape created an influential precedent for subsequent globe-making.

After 1500 globe making changed dramatically, and the idea of making models of the earth and the heavens for a wider public gained momentum for several reasons. The technical innovation of printing with moveable type in the 1450s had enabled the

wider circulation of all types of text and of knowledge in general. Interest in the classical world had been rekindled in this Renaissance period; old knowledge was looked at afresh, and new ways of thinking and seeing flourished. At the end of the 15th century and in the early years of the 16th some seminal texts, such as Latin translations of Ptolemy's *Geographia* and *Almagest*, were printed for the first time and so became more accessible. These comprehensive books were of particular interest to scholars and stimulated an intellectual and scientific curiosity to know more about the world and the cosmos.



A Roman globe, ca. AD 50, depiction with a north pole mountain like later time magnet mountains. Found in the Boscoreale villa near Pompeii. Size of original 61 x 39.7 cm. It is less known because it was originally misinterpreted as a sundial.

Furthermore, the age of exploration was truly under way. Navigation became a crucial skill for the advancement of trade and conquest, and constantly expanding geographical and astronomical knowledge fuelled the demand for maps and sea charts. By the end of the 15th century printing had begun to be used for mapmaking, and therefore the availability and circulation of maps was greatly increased. Map-makers became concerned with new ways of representing the constantly changing view of the earth. The growth of interest in exploring unknown lands inspired experimentation in the art of globe-making, and the first half of the 16th

century saw the production of several globe models, both hand-painted and printed. Printing made it possible to produce globes in greater numbers at lower cost so they could be more widely distributed. The printed globe, terrestrial and celestial, soon became established as the standard type of globe, sometimes called the 'common' globe, and the methods of manufacture changed surprisingly little from the mid-16th century until the 20th century; though one-off manuscript globes continued to be made as special commissions for wealthy patrons.

The 16th century opened with a marvelously increased interest in geography, the result of a climax reached the trans-oceanic discoveries in which Columbus led the way. If the makers of plane maps became now increasingly active, so the makers of globes were becoming increasingly numerous, and at first in the countries of trans-alpine Europe. Following Behaim's famous model, the next significant terrestrial globe is that designed in 1507 by the German cartographer Martin Waldseemüller (1470-1521), who worked in Saint Die, France (#310). He is thought to have been the author of the first printed globe gores, a "gore" being one of the printed segments of paper that is pasted onto the globe sphere. Waldseemüller is also remembered for giving the name *America* to the New World (after the explorer Amerigo Vespucci).

The first globe-maker to bring printed terrestrial and celestial globes together as a matched pair was Johann Schöner (1477-1547), a German cleric turned printer who

worked in Bamberg and then Nuremberg (#328). He made several manuscript globes and started to print them on a commercial basis in 1515.

Globes made of metal with engraved maps, as the *Lenox* and the *Jagellonicus* copper spheres (#314), globes with manuscript maps covering a sphere of special composition, as were those of Schöner, globes in the preparation of which engraved gore maps were employed, such as those of Waldseemüller, Boulengier (#324), Gemma Frisius, and Gerard Mercator, make their appearance in ever greater numbers.

While terrestrial globes showed the land and sea, celestial globes displayed the layout of the stars. On a practical level the mapping of the heavens was crucially important for seafaring, as sailors navigated across the seas using the positions of the stars. These factors, combined with the contemporary intellectual interest in cosmography (the study and representation of the relationship between the earth and the heavens), made Schöner's pairing of a terrestrial with a celestial globe immensely significant; though each type of globe had a value on its own, together they formed a compact model of the cosmos which would be adopted by globe-makers throughout the next 400 years.

Terrestrial and celestial globes have several elements in common. The framework for both consists of a set of lines: the equator, the ecliptic, the circles of the Tropics, and the Arctic and Antarctic circles. These lines on a terrestrial globe have counterparts in equivalent positions on a celestial globe. In addition, a celestial globe often displays meridian lines called *colures*, which cross the equinoctial and solstitial points. The user of a celestial globe must imagine the earth at the center of the sphere and the viewer beyond the heavens, looking down on the universe. The ancient Greek astronomer Hipparchus (active 161-121 BC) established the principle that, whereas star charts, drawn from a viewpoint on earth, show frontal representations of the figures of the constellations, on globes they would have to turn their backs to the user, corresponding to the reversed orientations of the stars.

Waldseemüller had published an explanatory text to accompany his globe, and Schöner relied heavily on this text in a manual that he published to accompany his own terrestrial globe. Schöner's *Luculentissima quaedam terrae totius descriptio* [A Very Clear Description of the Whole Earth] was issued in 1515 and contained additions about new Portuguese discoveries. Schöner's printed globes, like Waldseemüller's, were made using the technique of woodcut, and for any new edition, entirely new woodblocks had to be made, because the extent to which existing blocks could be altered was limited. Around 1533 Schöner produced a new pair of printed globes, with updated cartography; America is shown on the terrestrial globe, supposedly linked to Asia. His globes became well known throughout Europe. In Hans Holbein's painting known as *The Ambassadors* (1533), the celestial globe that is so clearly depicted on the top shelf is undoubtedly based on one made by Schöner. The terrestrial globe on the lower shelf bears similarities to Schöner's terrestrial globes, though no firm attribution has yet been made. The inclusion of globes in the painting illustrates not only the renown of Schöner's work, but also the use of globes as symbols, a constant theme in their history. Globes can signify wealth and power, indicate knowledge and learning, and allude to the temporal or the eternal, depending on the context. In paintings, terrestrial globes often appear in portraits of royalty and state officials to signify authority and possession of foreign lands.

Globes also appear in portraits of explorers and navigators to signal the nature of their accomplishments. Terrestrial globes in *vanitas* still-life paintings remind us that

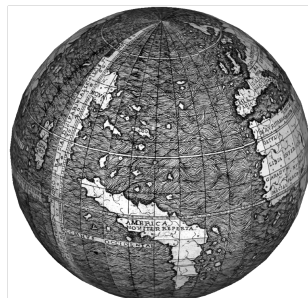
earthly pleasures are fleeting and finite. Since Roman times globes have frequently appeared on coins and commemorative medals; and when used today in the logos of large companies and institutions, they instantly and obviously lay claim to wide influence and authority.

Though there were other globe-makers in the 16th century, for example Georg Hartmann (1489-1564, #359) of Nuremberg and Kasper Vopel of Cologne (1511-1561, #364), Schöner is the best known, perhaps because his globes were more widely distributed. His influence extended well beyond globe-making, as he played a significant role in encouraging the publication in 1543 of *De revolutionibus orbium coelestium* [On the Revolutions of the Heavenly Spheres], the treatise by Nicolas Copernicus (1473-1543) that placed the sun, rather than the earth, at the center of the universe.

The cartography of early globes was based on a mixture of sources. For terrestrial globes information came from the geography of Ptolemy, historic travelers' accounts such as that by the Venetian Marco Polo (1254-1324), nautical charts [*portolans*] used by Mediterranean sailors, and the most recently available reports, navigational charts and maps from Portuguese and Spanish explorers. Unknown parts of the world were often imagined, and *Terra Australis* - the hypothetical large southern continent, thought to balance the northern landmass - continued to appear on some globes until the 18th century. Obviously globes, like maps, became steadily more accurate as detailed information became available.

Schöner had created a market for globes, and as the demand for them increased, others started to take an interest in their production, which involved the skills of many. Roeland Bollaert, a bookseller in the thriving Flemish town of Antwerp, had a keen interest in cosmography and spurred the foundation of a new center of globe-making in northern Europe. In 1527 he financed the printing of Schöner's manuals in Antwerp, and found people with the practical and intellectual skills needed to make globes in the university town of Louvain. The globes that were produced there proved to be highly influential during this period.

Gemma Frisius (1508-1555) was a student in Louvain where he later became a professor of medicine while maintaining an interest in mathematics and astronomy. He was commissioned to make a terrestrial globe that appeared around 1530. In order to explain the full use of globes, it became common practice for globe-makers to publish an accompanying manual or treatise. In Gemma's manual, *De principiis astronomiae et cosmographiae deque usu globi* [Principles of Astronomy and Cosmography and the Use of the Globe], while acknowledging his debt to Johann Schöner, he called his globe a '*cosmographic globe*' because he added several features from a celestial globe. In addition to the ecliptic circle (which appeared on Schöner's terrestrial globes) he added a number of stars. From illustrations in his book it appears that he also adopted the hour circle from Schöner's celestial globe.





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